1. (As Filed) An apparatus for a communications network, the apparatus comprising:

at least one interface circuit that reads frame data received from the communications network and writes frame data to be transmitted over the communications network, the frame data including a plurality of transport overhead fields; and

signature logic coupled to the at least one interface circuit, wherein the signature logic identifies signature data and writes the signature data into at least one of plurality of transport overhead fields in an outgoing frame.

B1

Claims 2-42 Cancelled.

43. (New) An apparatus for a communications network, the apparatus comprising:

a plurality of interface circuits, wherein

the interface circuits are disposed in at least one router,

the at least one router is configured to receive a received frame at one of the interface circuits and to read signature data from the received frame,

the signature data identifies one of the interface circuits as an active interface, and

the at least one router is configured to configure a communications relationship using the signature data.

B2 cont

44. (New) The apparatus of claim 43, wherein

at least one of the interface circuits is associated with a protect interface, the protect interface being an active interface when data transmission to a working interface is disrupted, and

the working interface are ones of the interface circuits.

45. (New) The apparatus of claim 43, wherein

at least one of the another plurality of interface circuits comprises a protect interface and a working interface,

the protect interface functions as a backup interface,

the working interface functions as a primary interface, and

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ones of the at least one router housing the protect interface and the working interface are configured to determine configuration compatibility between the protect interface and the working interface using the data.

46. (New) The apparatus of claim 43, wherein

the ones of the at least one router housing the protect interface and the working interface are further configured to determine configuration compatibility among a plurality of tributary interfaces using the data.

B2 cont

47. (New) The apparatus of claim 43, further comprising:

at least one interface circuit configured to read incoming frame data received from the communications network and to write outgoing frame data to be transmitted over the communications network, wherein

the at least one interface circuit is coupled to the at least one router via the communications network, and

the incoming and the outgoing frame data each comprise a plurality of transport overhead fields; and

signature logic coupled to the at least one interface circuit, wherein the signature logic is configured to identify the signature data and to write the signature data into at least one of the transport overhead fields in the outgoing frame.

48. (New) The apparatus of claim 47, wherein the signature data comprises data identifying the at least one interface as one of a multiplex section protection (MSP) working circuit, a MSP protect circuit, and a non-MSP circuit.

49. (New) The apparatus of claim 47, wherein the signature data comprises data identifying the at least one interface as one of an automatic protection switching (APS) working circuit, an APS protect circuit, and a non-APS circuit.

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50. (New) The apparatus of claim 47, further comprising:

reflector logic coupled to the at least one interface circuit, wherein

the reflector logic is configured to copy data from at least one of the transport overhead fields of the incoming frame data,

the data comprises the signature data, and

the signature logic is further configured to write the data into the at least one of the transport overhead fields in the outgoing frame.

51. (New) The apparatus of claim 50, wherein the at least one router uses the data to determine configuration compatibility among the interface circuits and the at least one interface circuit.

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52. (New) The apparatus of claim 50, wherein

the at least one interface circuit is configured to compare the data to earlier-received frame data in order to determine whether the signature data matches signature data identified in the earlier received frame data, and

a transition is identified if the data and earlier-received frame data do not match.

53. (New) The apparatus of claim 52, wherein the transition is a router transition.

54. (New) The apparatus of claim 53, wherein the router transition is between a plurality of routers at a remote location.

55. (New) The apparatus of claim 53, wherein the router transition is one of an APS switch and an MSP switch.

56. (New) The apparatus of claim 50, wherein the at least one interface circuit is configured to compare the data to later-received frame data in order to determine whether to update a routing table.

57. (New) The apparatus of claim 47, wherein the transport overhead field of the incoming frame data and the outgoing frame data are each a path-level overhead field.

58. (New) The apparatus of claim 47, wherein the path-level overhead field of the incoming frame data and the outgoing frame data are each a byte of a multi-byte path trace message conveyed by a path trace byte.

59. (New) The apparatus of claim 58, wherein the path trace byte of the incoming

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frame data and the outgoing frame data are each represented by a Synchronous Optical NETwork (SONET) path trace byte of a SONET OC-3c frame, according to a STS-3c standard for SONET, the path trace byte being designated by J1.

60. (New) The apparatus of claim 47, wherein
the communications network comprises a plurality of add-drop multiplexers,
each of the add-drop multiplexers is configured to receive and transmit the data while maintaining the data.

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61. (New) The apparatus of claim 47, wherein the communications network is one of a Synchronous Digital Hierarchy (SDH) and a Synchronous Optical NETwork (SONET).

62. (New) The apparatus of claim 47, wherein
the signature logic is a program product, and
the program product comprises signal bearing media bearing means for identifying the signature data and writing the signature data into the at least one of the transport overhead fields in the outgoing frame.

63. (New) The apparatus of claim 62, wherein the signal bearing media further comprises recordable media.

64. (New) The apparatus of claim 62, wherein the signal bearing media further comprises transmission media.

65. (New) The apparatus of claim 47, wherein the reflector logic is a program product and wherein the program product comprises signal bearing media bearing means for copying data from received transport overhead fields and means for placing the copied data into a transport overhead field in an outgoing frame.

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66. (New) The apparatus of claim 65, wherein the signal bearing media further comprises recordable media.

67. (New) The apparatus of claim 65, wherein the signal bearing media further comprises transmission media.

68. (New) A method for operating a communications network comprising:
receiving data in a transport overhead field at a remote router, wherein
the data identifies an active interface in a local router, and
the local router and the remote router are coupled to one another via the communications network; and
reflecting the data back to the local router from the remote router.

B3 Cont

69. (New) The method of claim 68, further comprising:
avoiding alteration of the data by one or more add-drop multiplexers.

70. (New) The method of claim 68, further comprising:
in the remote router, using the data to determine which among a plurality of local interface circuits is the active interface in the local router.

71. (New) The method of claim 68, further comprising:
in the remote router, using the data to determine whether there has been a transition among a plurality of local interface circuits, the transition changing the identity of the active interface in the local router.

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72. (New) The method of claim 68, wherein the transport overhead field is a path-level overhead field of a frame, the path-level overhead field being received and transmitted by a plurality of intermediate add-drop multiplexers, the plurality of intermediate add-drop multiplexers maintaining the transport overhead field.

73. (New) The method of claim 72, wherein the path-level overhead field is a byte of a multi-byte path trace message conveyed by a path trace byte.

74. (New) The method of claim 73, wherein the path trace byte is represented by a Synchronous Optical NETwork (SONET) path trace byte of a SONET OC-3c frame, according to a STS-3c standard for SONET, the path trace byte being designated by J1.

75. (New) The method of claim 68, further comprising:
comparing the data to later-received frame data from the communications network to determine whether to update a routing table.

76. (New) The method of claim 68, further comprising:
using the data to determine configuration compatibility among a plurality of interface circuits.

77. (New) The method of claim 68, wherein the communications network is one of a Synchronous Digital Hierarchy (SDH) and a Synchronous Optical NETwork (SONET).

78. (New) The method of claim 68, further comprising:
transmitting the data in the transport overhead field to the remote router;
receiving the data reflected from the remote router at the local router; and
configuring a communications relationship using the data.

79. (New) The method of claim 78, further comprising:
avoiding alteration of the data by one or more add-drop multiplexers.

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80. (New) The method of claim 78, further comprising:
in the remote router, using the data to determine which among a plurality of local

interface circuits is the active interface in the local router.

81. (New) The method of claim 78, further comprising:
in the remote router, using the data to determine whether there has been a transition among a plurality of local interface circuits, the transition changing the identity of the active interface in the local router.

82. (New) The method of claim 78, wherein the transport overhead field is a path-level overhead field of a frame, the path-level overhead field being received and transmitted by a plurality of intermediate add-drop multiplexers, the plurality of intermediate add-drop multiplexers maintaining the transport overhead field.

83. (New) The method of claim 82, wherein the path-level overhead field is a byte of a multi-byte path trace message conveyed by a path trace byte.

84. (New) The method of claim 83, wherein the path trace byte is represented by a Synchronous Optical NETwork (SONET) path trace byte of a SONET OC-3c frame, according to a STS-3c standard for SONET, the path trace byte being designated by J1.

85. (New) The method of claim 78, further comprising:
comparing the data to later-received frame data from the communications network to determine whether to update a routing table.

86. (New) The method of claim 78, further comprising:
using the data to determine configuration compatibility among a plurality of interface circuits.

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